



8 Port 10/100Mbit/s Ethernet Smart Switch with Fibre Uplink

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Product User Guide

Introduction

This compact Tyco Electronics/AMPNetconnect auto-negotiating Ethernet workgroup smart switch enables SOHO users and small size workgroups to have high speed, low latency LAN connections to the main network using a fibre link.

The automatic sensing of the connected 10/100Mbit/s data rate and the detection of either a switch/hub or PC connected to the Ethernet copper ports eliminates the need for any Ethernet cross-over cables and greatly simplifies installation.

Package Contents

Unpack the contents and verify them against the items below:-

1. Ethernet switch
2. AC Power cable.
3. Four rubber feet.
4. Console port serial cable

If any item is damaged or missing, please contact your dealer.

Features

- 8 Auto-sensing 10/100Base-T RJ-45 Ethernet ports
- 1 Fibre Uplink Port (100Base-FX Format)
- Full auto-MDI/MDI-X on all Ethernet copper ports removes the need for cross-over cables
- Meets IEEE 802.3, .3u and .3x Ethernet standards
- Uses store-and-forward switching to separate collision domains and provide abnormal packet filtering
- Console port enables basic management of the switch
- Supports up to 7 port based VLANs
- Integral 4K MAC address table automatic learning
- Large 2Mb packet buffer
- Very high backplane bandwidth
- Supports back-pressure & flow control
- Numerous diagnostic LED indicators
- Very compact, stand-alone or 10" rack mounting
- Optional 19" rack mounting
- FCC Class A and CE mark certification

Technical Support and Service

If you require technical advice for these products, please see the FAQ pages on the web address <http://www.lan-electronics.com>

If you still have problems, please contact us using the support form located on the above web site.

If you have a faulty unit then please contact us through the web site to arrange for a replacement unit. The faulty unit must be returned to us as part of the replacement agreement.

Front Panel

The front panel of the switch has the LED indicators, the fibre uplink port and the RJ-45 Shielded/Unshielded Ethernet Ports.

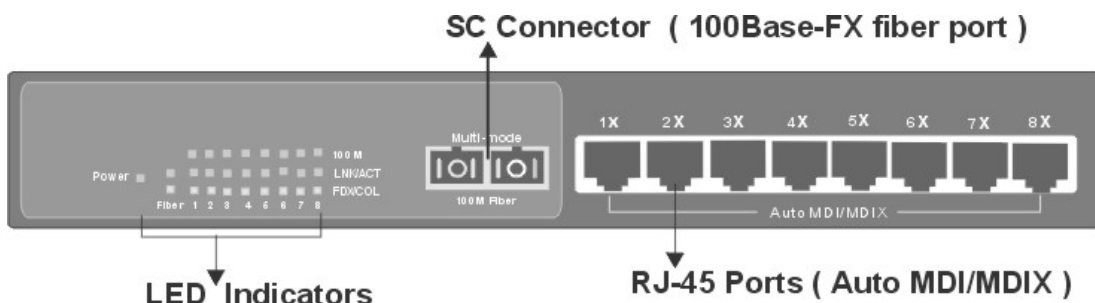


Figure 1 - Switch Front Panel

Rear Panel

The rear panel of the switch contains the IEC style power inlet connector and the console management connector.



Figure 2 –Switch Rear Panel

Ports

- **RJ-45 Ports.** These Ethernet RJ-45 ports support both shielded and unshielded cabling systems. Each port auto-negotiates the 10/100Mbit/s network speed and auto-detects the connected device type which eliminates the need for cross-over cables.
- **Fibre Port.** The switch has a fibre uplink port that can be connected to 100Base-FX devices. Different optical connector formats are available (ST/SC/MT-RJ) together with singlemode and multimode fibres.
- **Console Port.** This port enables the administrator to change switch settings such as port values, VLANs etc.
- **AC Power Connector** This connector accepts any standard IEC 320 style power connector.

Product Models

The following table shows the model numbers of the switches that are available:-

Product	Part Number
Switch with SC multimode connector	0-1591038-x
Switch with ST multimode connectors	0-1591040-x
Switch with MT-RJ multimode connector	0-1591042-x
Switch with SC singlemode connector	0-1591044-x

Table 1 - Product Codes

Where –x is the code for the country. Consult the web site for the country code table.

Installation

Copper and Fiber Cabling Guidelines

1. The RJ-45 ports can be connected to unshielded twisted pair (UTP) or shielded twisted pair (STP) cabling systems compliant with the IEEE 802.3u 100Base TX standard for Category 5. The cable between the switch and the link partner device (router, hub, workstation, etc.) must be less than 100 metres long.
2. The switch auto-detects the type of connected device (PC or hub) and automatically configures the RJ-45 port to avoid the need for an Ethernet cross-over cable.
3. The fibre link must use either 50 or 62.5/125 micron multi-mode or 9/125 micron singlemode cable (dependant on model). You can link two devices over a distance of up to 2km for multimode or 15km on singlemode. See optical budget specifications.
4. The console port is an RS232 port and should not be used for cable distances greater than 20 metres. Use the supplied data cable wherever possible.

Desktop Installation

1. Fit the self-adhesive rubber feet to the underside of the switch.
2. Locate the switch in a clean, flat and safe position that has easy access to AC power. Ensure that there is sufficient clearance around the switch to enable air circulation.

Completing The Installation

When the switch has been installed as specified above, then the unit can be configured as detailed below:-

1. Connect the AC power cable to the switch. The green Power LED on the front panel of the switch should light.
2. Connect the Cat. 5/5e twisted pair cables from the network partner devices to the RJ-45 ports on the switch. When a network connection is obtained, the green LK/ACT LED associated with the port will light.
3. Connect the fibre link to the partner device (media converter, fibre NIC card or fibre switch etc). Verify that the green LK/ACT LED for the fibre port is lit which indicates that the optical link is valid.
4. If advanced modes such as port configuration or port-based VLANs are needed, then use the console port to configure the switch. See the console port instructions on page 7.
5. If legacy devices that do not support auto-negotiation are connected to the RJ-45 ports, then it may be necessary to program the switch to match the speed and duplex modes of the partner devices. See page 9
6. Note that auto-negotiation can take up to 30 seconds to complete depending on the partner device.

LED Indicators

The diagnostic LED indicators located on the front panel of the switch provide real-time information about switch status. The following table describes the LED status and meaning.

	LED	Colour	Function	
	Power	Green	Power on	
UTP PORT	10/100	Green	The UTP port is operating at 100Mbit/s	
		Off	The UTP port is operating at 10Mbit/s or no partner device is attached	
	LK/ACT	Green	Ethernet link pulses are present	
		Blinks	Port transmitting or receiving packets	
		Off	No device is attached or faulty cable	
	FDX/COL	Orange	The port is in full-duplex mode	
		Blinks	Collisions in half-duplex mode	
		Off	The port is in half-duplex mode	
	FIBRE PORT	LK/ACT	Green	Ethernet fibre pulses are present
Blinks			Port transmitting or receiving packets	
Off			No device is attached or faulty cable	
FDX/COL		Orange	The port is in full-duplex mode	
		Blinks	Collisions in half-duplex mode	
		Off	The port is in half duplex mode or not connected correctly	

Configuring The Console Port

The switch has a console port on the rear panel that can be used to provide simple control and configuration of the unit. The following port controls are available:-

- Port Data Rate
- Port Duplex Mode
- Port Based VLAN Assignment

A PC can be used to communicate with the switch using the console port. A terminal emulation program such as Windows Terminal or HyperTerminal is configured to the following settings:-

- Com Port 1 or 2
- Speed = 9600
- Data Bits = 8
- Parity = None
- Stop Bits = 1
- Flow Control = None

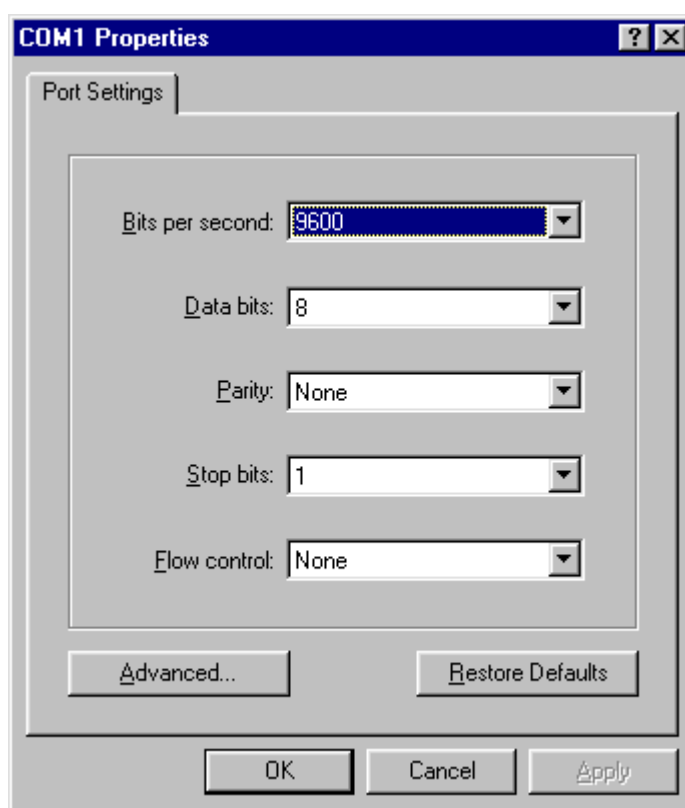


Figure 3 - Console Port Settings

Connect the PC RS232 serial port to the Console port using the data cable supplied with the switch. Enter any key and the screen should now show the top-level console display.

This entry screen is displayed when the connection is first established with the switch. Select the required option. Note that the options 3 and 4 are immediate and do not have any confirmation steps.

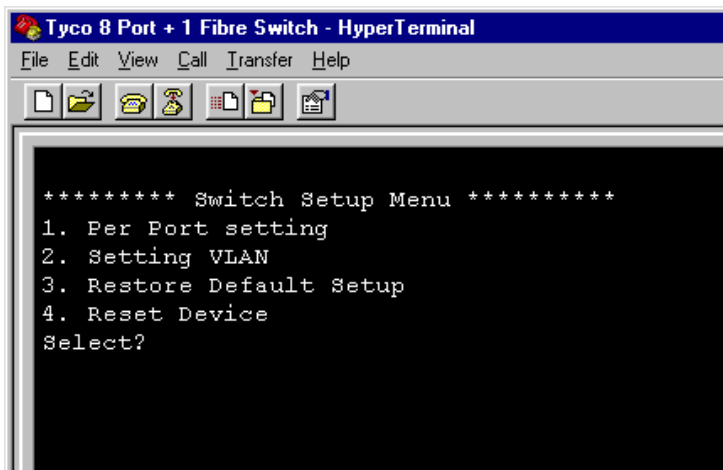


Figure 4 - Entry Screen

The port setting screen is selected by entering 1 in the entry menu.

The screen then shows the current state of all the switch ports similar to the image to the right.

To change a port setting, enter the port number (1..9) and a new screen is displayed similar to Figure 6 on the next page.

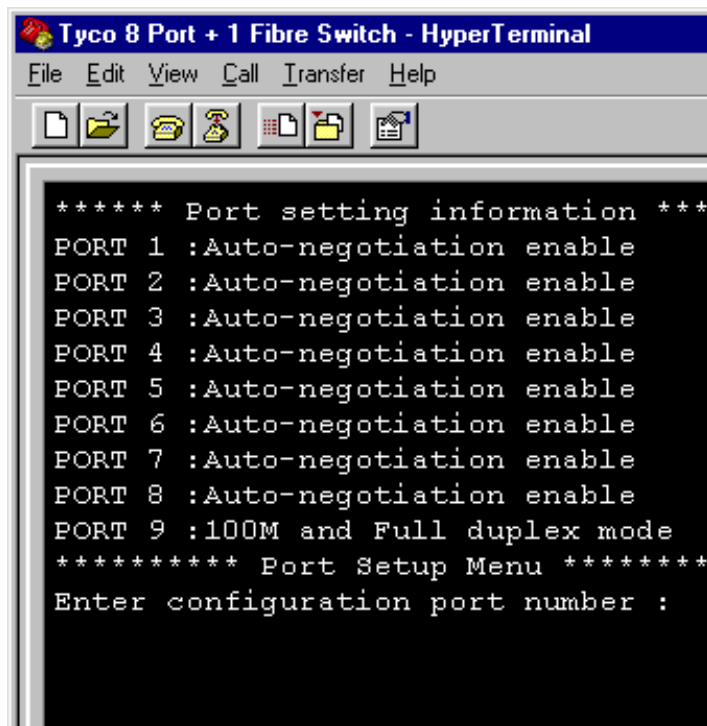
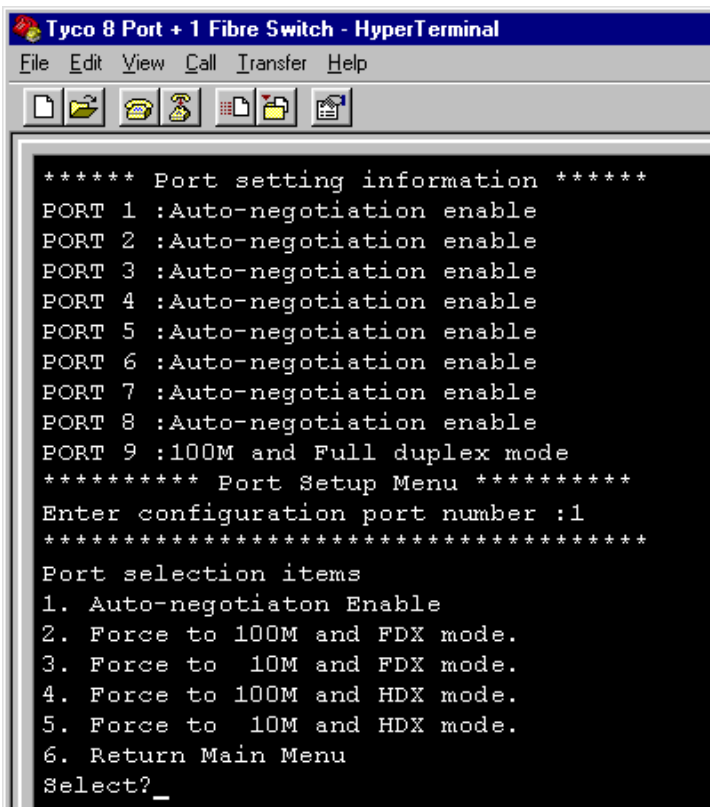


Figure 5 – Port Setting Screen - 1

This screen enables the port speed and duplex mode to be controlled.

The default is auto-negotiation which is the best method for most new networks. However, some legacy systems may need to use fixed duplex and speeds, so these can be applied on the switch using this menu.

Select the option 1..5 to change port settings or select 6 to return to the main menu.

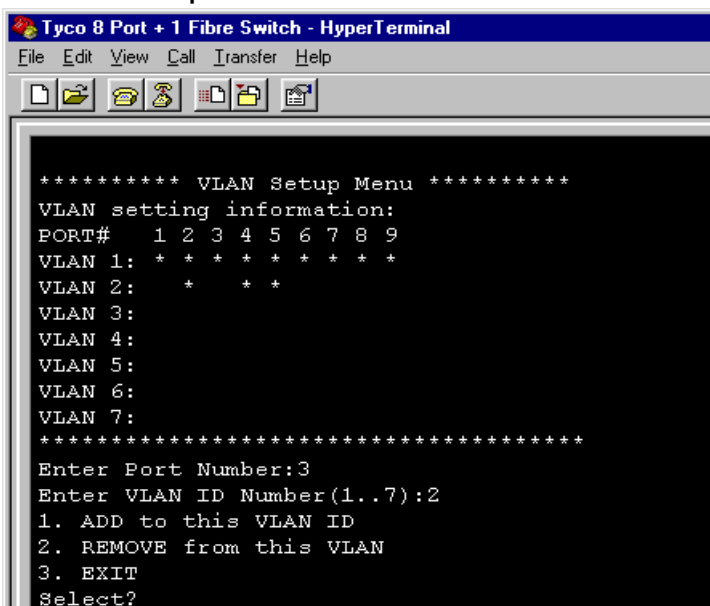


```
Tyco 8 Port + 1 Fibre Switch - HyperTerminal
File Edit View Call Transfer Help
***** Port setting information *****
PORT 1 :Auto-negotiation enable
PORT 2 :Auto-negotiation enable
PORT 3 :Auto-negotiation enable
PORT 4 :Auto-negotiation enable
PORT 5 :Auto-negotiation enable
PORT 6 :Auto-negotiation enable
PORT 7 :Auto-negotiation enable
PORT 8 :Auto-negotiation enable
PORT 9 :100M and Full duplex mode
***** Port Setup Menu *****
Enter configuration port number :1
*****
Port selection items
1. Auto-negotiaton Enable
2. Force to 100M and FDX mode.
3. Force to 10M and FDX mode.
4. Force to 100M and HDX mode.
5. Force to 10M and HDX mode.
6. Return Main Menu
Select?_
```

Figure 6 - Port Configuration - 2

Simple port based VLANs can be created by selecting option 2 from the entry menu. There are 2 steps to create VLANs. First draw a map that shows a matrix of ports and VLANs.

Then select the port and the required VLAN ID (1..7). To add the port to the VLAN, enter option 1 and then enter option 3 to save the setting. Repeat this for all required VLAN and port combinations. Note that the switch resets each time the VLAN state is viewed. This is normal.



```
Tyco 8 Port + 1 Fibre Switch - HyperTerminal
File Edit View Call Transfer Help
***** VLAN Setup Menu *****
VLAN setting information:
PORT#   1 2 3 4 5 6 7 8 9
VLAN 1: * * * * *
VLAN 2:  *  *
VLAN 3:
VLAN 4:
VLAN 5:
VLAN 6:
VLAN 7:
*****
Enter Port Number:3
Enter VLAN ID Number(1..7):2
1. ADD to this VLAN ID
2. REMOVE from this VLAN
3. EXIT
Select?_
```

Figure 8 - VLAN Configuration

Trouble Shooting

Power

1. Verify that the AC power is present and that the external fusing is correct and compliant with national requirements. The green Power LED should be lit to indicate that the switch is powered correctly.

Data Problems

1. Ensure that the Ethernet partner device (switch, router, NIC etc) connected to the RJ-45 UTP port of the switch is set for auto-negotiation. If this Ethernet partner device does not support auto-negotiation, then you need to program that device to operate at 100Mbit/s half duplex or 10Mbit/s half duplex or program this switch using the console port.
2. If the switch and the partner device cannot auto-negotiate then both units automatically revert to the lower level of half-duplex operation. This issue is common to all auto-negotiating Ethernet devices and the symptoms of incorrect negotiation include data errors and fragmented packets.
3. Auto-negotiation can take up to 30 seconds to complete depending on the partner device.
4. Ensure that the switch is not overheating due to obstructed airflow around the side vents.
5. Select the proper fibre cable for your network. See page 4 for the supported cable types and installation settings.
6. Ensure that the optical loss budget of the fibre uplink is within the limits specified on page 11. Note that optical patch cables and other joints and splices can introduce additional optical losses that reduce the working distance of the fibre link.
7. Restore factory settings by selecting option **3** on the main menu of the console port.

Console Problems

1. Verify that the PC has been set up with the correct serial link settings as detailed on page 7.
2. Ensure that the serial data cable supplied with the switch is used.

If you still have problems and need further advice, please see Technical Support section on page 2 to obtain more information.

Fibre Uplink Port Specifications

The switch has a 100Base-FX optical fibre uplink port that operates at the 1310nm optical wavelength for both the multimode and singlemode models.

The fibre size used for multimode links is 50/125 or 62/125 micron. The fibre size used for singlemode links is 8/125 or 9/125 micron.

The maximum distance between any two fibre optic devices is determined by a number of factors including optical link loss, the type and number of patch cords and joints in the link, the launch power of the transmitter and the sensitivity of the receiver. These variables make calculating the maximum working distance between two converters quite difficult and so it is best to design networks using optical loss budgets rather than using just working distance.

Plug-In Fiber Ethernet Module Type	Average Launch Power dB	Average Power Loss Budget dBm	Average Sensitivity dB
Multimode Converter (SC)	-18dB	12dBm	-30dB
Multimode Converter (ST)	-18dB	12dBm	-30dB
Multimode Converter (MT-RJ)	-16dB	14dBm	-30dB
Singlemode Converter (SC)	-18dB	12dBm	-30dB

Table 2 - Optical Specifications

Product Specifications

Standards Compliance	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100 BASE-TX Fast Ethernet IEEE 802.3u 100 Base-FX Fast Ethernet ANSI/IEEE standard 802.3 N-way Auto-Negotiation
Max Forwarding Rate	14,880 pps Ethernet port (10Mbit/s) 148,800 pps Fast Ethernet port (100Mbit/s)
Packet Size	64 to 1522 Bytes
LED Indicators	Power, Speed, Link Activity, Duplex/Coll.
Ethernet LAN Network Cable	2-pair UTP/STP Cat. 3, 4, 5 cable EIA/TIA-586 100-ohm
Fibre Uplink	100Base-FX using SC, ST or MT-RJ connectors multimode or SC singlemode
Console	9600bit/s, 1 Stop bit, No Parity, No Flow Control
MAC Table	4K Addresses
VLANs	Up to 7 Port Based VLANs
Switch Bandwidth	1.8Gbit/s
Dimensions	250mm x 132mm x 37mm (W x D x H)
Mounting Format	Standalone or rackmount with optional adapter plates (0-1591068-0)
Weight	1.2Kg
Temperature	0°C to 45°C (32°F to 113°F) (Operating)
Humidity	10% to 90% (Non-condensing)
Power Connection	IEC 320 Format Main Cord
Power Supply	100v to 240v AC, 50/60Hz auto-ranging.
Power	21 Watts (Max.)
EMI	FCC Class A and CE Mark

Table 3 - Product Specifications